

Kazuko M. HASEGAWA*: Cytotaxonomical notes on
Thalictrum simplex var. *brevipes* of Japan

長谷川一子*: ノカラマツの細胞分類学的予察

Thalictrum simplex L. is widely distributed in Eurasia, and the Japanese plants have been distinguished as var. *brevipes* Hara mainly based on its short pedicel. Cytologically basic chromosome number is considered to be

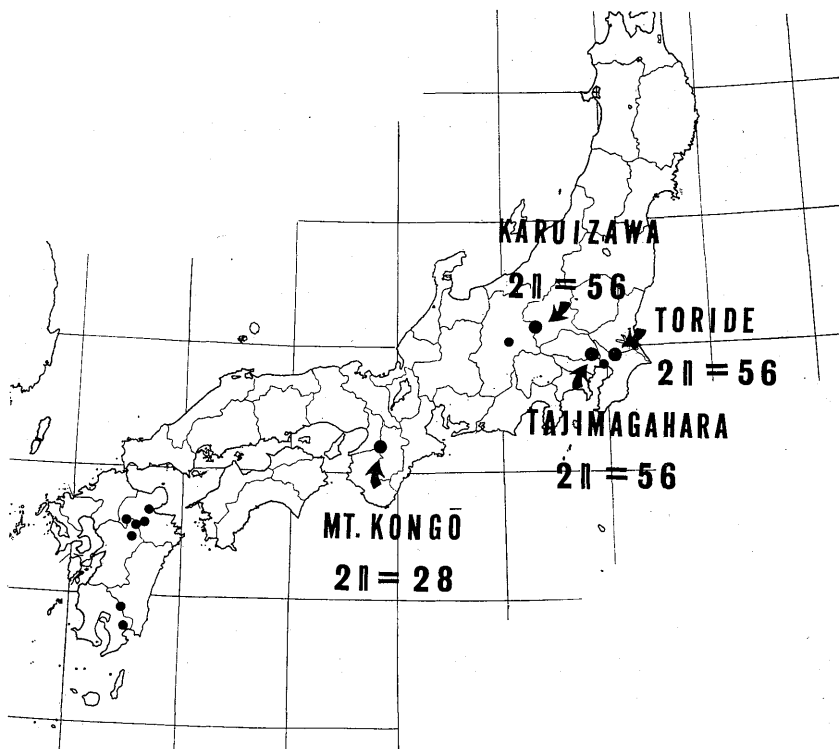


Fig. 1. Distribution map of *T. simplex* var. *brevipes* Hara. Large circles illustrate the two chromosome races, and small ones were drawn by the Herbarium specimens.

* Department of Botany, Faculty of Science, University of Tōkyō, Hongō, Tōkyō. 東京大学理学部植物学教室.

$X=7$, and $2n=56$ (Langlet 1927, Kuhn 1928) and $2n=70$ (Kuhn 1928) chromosomes were described about the European plants, however, no chromosome number has been reported on the Japanese ones.

I have studied on cytotaxonomy of *Thalictrum* for a few years and now, I have found two chromosome races of *T. simplex* from Japan. They are $2n=28$, tetraploid in Mt. Kongô, and $2n=56$, octaploid in Tajimagahara, Toride, and Karuizawa. (Figs. 1 & 2) Those plants can hardly be separated each other by outer morphological characters. In the present report, I wish to preliminarily describe about each plant of both races comparatively.

The tetraploid race of $2n=28$ was first found from Mt. Kongô, Ôsaka Pref. of Kinki region, where is almost covered with the *Cryptomeria japonica* forest, and *T. simplex* occurs only in a small open grassland mainly composed of *Miscanthus sinensis*, alt. 960 m, near the top of the mountain. Ten plants there were all confirmed to be $2n=28$. The size of pollen grains and stomata were measured and shown in Table 1. Both pollen and stomata

Table 1. Comparison between two races of *T. simplex* and *T. minus*, chromosome number, pollen size, stomatal length and number of carpels. They were counted and measured on an identical plant obtained from each locality.

| Locality | $2n$ | Pollen size (μ) (Mean of 50 grains) | Stomatal length (μ) (Mean of 50 stomata) | Number of carpels per a flower |
|-------------------|------|--|---|-----------------------------------|
| <i>T. simplex</i> | | | | |
| Mt. Kongô | 28 | 15.5×15.1 | 23.0 | 2-3(-4) |
| Tajimagahara | 56 | 16.6×16.3 | 27.8 | (3-)4-5(-6) |
| Toride | 56 | | 27.2 | |
| Karuizawa | 56 | 18.7×18.7 | 28.1 | (3-)4-5(-7) |
| <i>T. minus</i> | | | | |
| Mt. Kongô | 42 | 19.5×19.6 | 27.0 | |
| Karuizawa | 42 | 19.2×19.0 | 28.6 | |

were smaller than those of octaploid plants. The carpels were also observed to be 2-3(-4) in a flower as far as I counted thirty flowers per a plant, clearly less than those of the octaploid plants. (Table 1.) They flower from middle August to early September, almost similar to the octaploid plants of

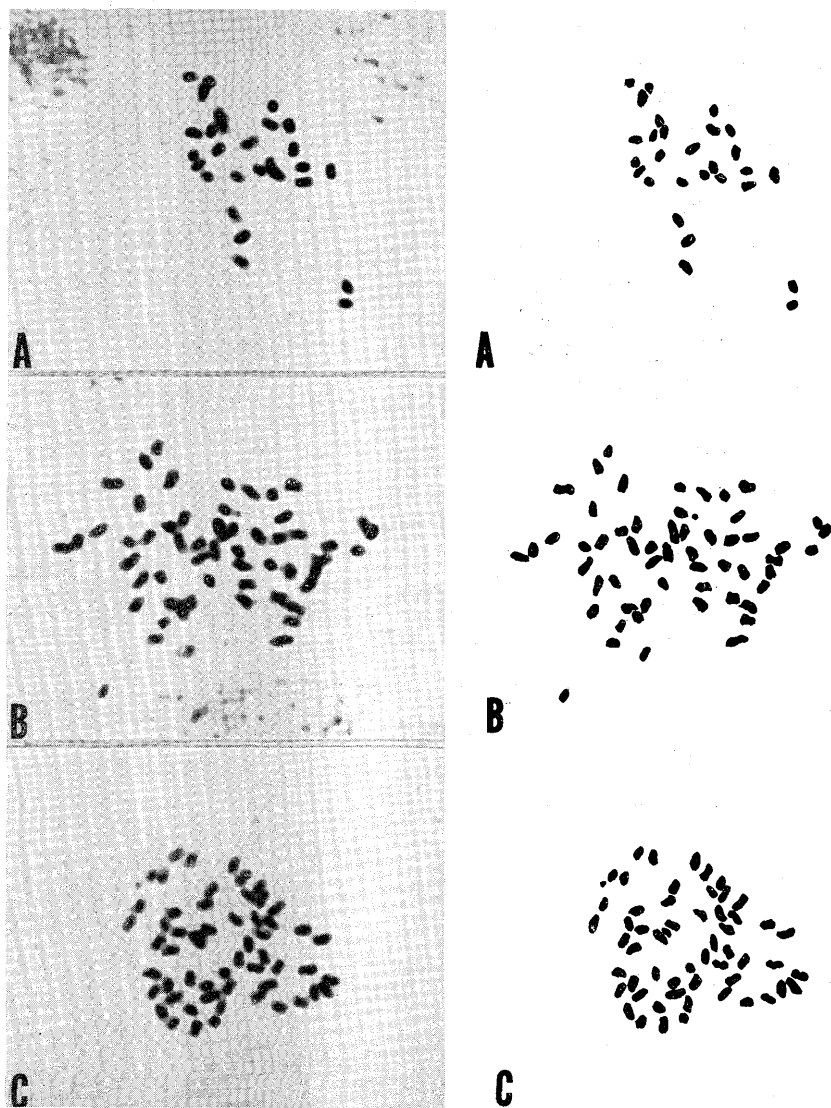


Fig. 2. Somatic chromosomes of *T. simplex* var. *brevipes* from three localities.
A. $2n=28$ (Mt. Kongô), B. $2n=56$ (Tajimagahara), C. $2n=56$ (Karuizawa).
 \times ca. 3000.

Karuizawa, on the other hand, about two months later than those of the Kantô region. The other distinguishable characters from the other race were difficult to find. It is noteworthy that the tetraploid *T. simplex* occurs only in Mt. Kongô, and that no *T. simplex* has been found from the other parts of the Kinki region.

The octaploid race of $2n=56$ was found from the lower moist grassland of Kantô region, Tajimagahara and Toride, and the higher grassland of Chûbu region, Karuizawa. There are moist riverside grasslands mainly composed of *Miscanthus sacchariflorus* in both Tajimagahara and Toride. The ecological conditions seem to be different from the grassland of Mt. Kongô. The flowering time is early June to late June, about two months earlier than in Mt. Kongô. On the other hand, in Karuizawa, there exist a wide open grassland alt. 940 m, and the plants are growing together with *Miscanthus sinensis* in the limited area. The flowering time is late August to early September and the ecological conditions seem to be similar to the grassland of Mt. Kongô. The size of pollen grains and stomata were also measured as shown in Table 1. The stomatal size of all the three octaploid plants were about $4-5\mu$ clearly larger than the tetraploid plants. The pollen grains from Tajimagahara were only 1μ larger than those of the tetraploid, however, those from Karuizawa were largest of all, about 3μ larger than the tetraploid, and the size is rather similar to that of *T. minus* in Karuizawa and the other place. (Table 1) The correlation between pollen size and polyploidy seems not to be so apparent as clearly shown in the stomatal size. The carpels of the plants both in Tajimagahara and Karuizawa were (3-)4-5(-7) in a flower as far as I counted thirty flowers per a plant, and the octaploid plants were found to have more carpels than the tetraploid plants.

T. simplex also occurs in the other places of Kantô region, for example, Toda, Shimura, Koshigaya, Ichikawa, etc., and the flowering time and the ecological conditions are almost similar to those in Tajimagahara and Toride. Perhaps *T. simplex* which occurs in the area of Kantô region may be all octaploid. In the Chûbu region, *T. simplex* has been also found from Shirakabako in Mt. Kirigamine, where the ecological conditions are similar to those in Karuizawa. I have never observe the plant from Shirakabako, perhaps it may be octaploid as that in Karuizawa. No other place where *T.*

simplex exactly occur has yet known from the Chûbu region.

In the grassland of Karuizawa, *T. minus* which is the most closely related species with *T. simplex* in the genus *Thalictrum* occurs here and there. Some plants showing somewhat intermediate characters between the two species were also found from an area of Karuizawa, which seem to be a hybrid between *T. minus* and *T. simplex*. The chromosome numbers of six plants of them were $2n=42$, as same as those of *T. minus*. It is yet uncertain whether they are truly a hybrid or merely a variant type of *T. minus*, and the phyletic relation between these plants needs further critical studies.

No plant from Kyûshû region has yet been studied for lack of materials, however, whether *T. simplex* in Kyûshû is tetraploid or octaploid is the important question which must be resolved. It needs to make more clear the distribution of *T. simplex* in Japan and to study about more living materials in order to research the differentiation of *T. simplex* in Japan and the phyletic relation between *T. simplex* and *T. minus*.

Main references

- Darlington, C.D. & Wylie, A.P. 1955. Chromosome atlas of flowering plants. ed. 2: 22. Gregory, W.C. 1941. Trans. Am. Philos. Soc., n.s. 31: 476-479. Hara, H. 1952. Journ. Fac. Sci. Univ. Tokyo, III. 6(2): 56-57. Ikuse, M. 1956. Pollen grains of Japan. Kitamura, S. & Murata, G. 1961. Coloured illustrations of herbaceous plants of Japan II: 236-237. Kuhn, E. 1928. Jahrb. Wiss. Bot. 68: 382-430. Langlet, O.F.J. 1927. Svensk Bot. Tidskr. 21: 1-17. Löve, A. & Löve, D. 1961. Chromosome numbers of central and northwest European plant species. Opera Botanica (Lund) 5: 156. Ohwi, J. 1965. Flora of Japan, ed. 2: 615-616. Tamura, M. 1953. Act. Phytotax. Geobot. 15: 80-88. Tutin, T.G. et al. 1964. Flora Europaea I: 242.

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日本の 4 か所から採集したノカラムツの染色体数をしらべたところ 2 系統あることが分った。すなわち大阪府金剛山では $2n=28$, 埼玉県田島ヶ原, 茨城県取手および長野県軽井沢では $2n=56$ である。染色体数 $2n=28$ はこれまでに報告が無く日本でも金剛山のみに見られる。いろいろ形質をしらべると気孔が明かに $2n=56$ のものより小さくまた心皮の数が少ないことを除いては外部形態の変異などほとんど見られない。 $2n=56$ はすでにヨーロッパで報告されている。特に軽井沢では各地にアキカラマ

ツも見られ、ある場所ではノカラムツとの雑種と思われるものも見られた。今後は九州その他の多くの材料をさらにしらべ、これら 2 系統のノカラムツの分化を明らかにするとともに、これと最も関連深いアキカラムツとの関係を検討しなくてはならない。最後にノカラムツの現在生えている場所をご存知の方は教えて下さい。

○ハイタツナミソウ (山崎 敬) Takasi YAMAZAKI: On *Scutellaria tashiroi* Hayata in Formosa and Ryukyu.

台湾、琉球に分布するルソントツナミソウは、かつてフィリピンの *S. luzonica* Rolf. と同種とされていたが、1929 年工藤祐舜氏は別種であることを知り *S. playfairi* Kudo とした。別に 1934 年、大井次三郎氏は台湾からハイタツナミソウ *S. procumbens* Ohwi を報告し、翌 1935 年タロコ峽から var. *tomentosa* Ohwi を報告している。これより先 1919 年、早田文蔵氏は紅頭嶼から *S. tashiroi* Hayata をかいている。これらはすべて関連のある種類である。密に短い毛が茎に密着してはえていること、花筒が細く長いことなど共通している。すでに初島住彦氏は琉球のものに *S. tashiroi* の名を使っている。*S. tashiroi* は他のものより葉が大形であるが、同一種内の変異とみなされる。台湾本島の *S. playfairi* と *S. procumbens* とは同じものであり、ともに紅頭嶼の *S. tashiroi* の変種とみなすべきものと思う。これらの名を整理すると次のようになる。和名はフィリピンのものと別種であることから、ルソントツナミソウよりハイタツナミソウが適当である。 (東京大学理学部植物学教室)

***Scutellaria tashiroi* Hayata, Icon. Pl. Formos. 8: 85 (1919).**

Hab. Formosa: Isl. Lanyu (Y. Tashiro, 1912).

var. ***playfairi*** (Kudo) Yamazaki comb. nov.—*Scutellaria playfairi* Kudo in Mem. Fac. Sci. Agric. Taihoku Imp. Univ. 2: 254 (1929)—*S. luzonica* Rolfe var. *playfairi* (Kudo) Yamamoto in Journ. Soc. Tropic. Agric. 6: 558 (1934)—*Scutellaria luzonica* (non Rolfe) Hemsley in Journ. Linn. Soc. Bot. 26: 296 (1890)—*Scutellaria procumbens* Ohwi in Fedde Rep. Sp. Nov. 36: 52 (1934).

Hab. Ryukyu: Isl. Okinawa (J. Matsumura, 1894), Katsudake (Y. Kimura et I. Hurusawa, 1940). Formosa: Central mountains (Kawakami et Mori, 1906), Tainan, Taipu 大埔 (S. Sasaki), Takao, Liukuei 六龜 (G. Nakahara, 1905).

var. ***tomentosa*** (Ohwi) Yamazaki comb. nov.—*S. procumbens* Ohwi var. *tomentosa* Ohwi in Act. Phyt. Geobot. 4: 33 (1935).

Hab. Formosa: Taroko (S. Sasaki, 1935), (I. Sasaki, 1965).

- 1) Folia 2-4 cm longa 1.5-3 cm lata. var. *tashioroi*
Folia 0.8-1.8 cm longa et lata. 2
- 2) Folia subtus strigoso-pubescentia var. *playfairi*
Folia subtus pilis longis dense cinero-tomentosa var. *tomentosa*